Potential GHG Markets In California: Lessons from Other Markets

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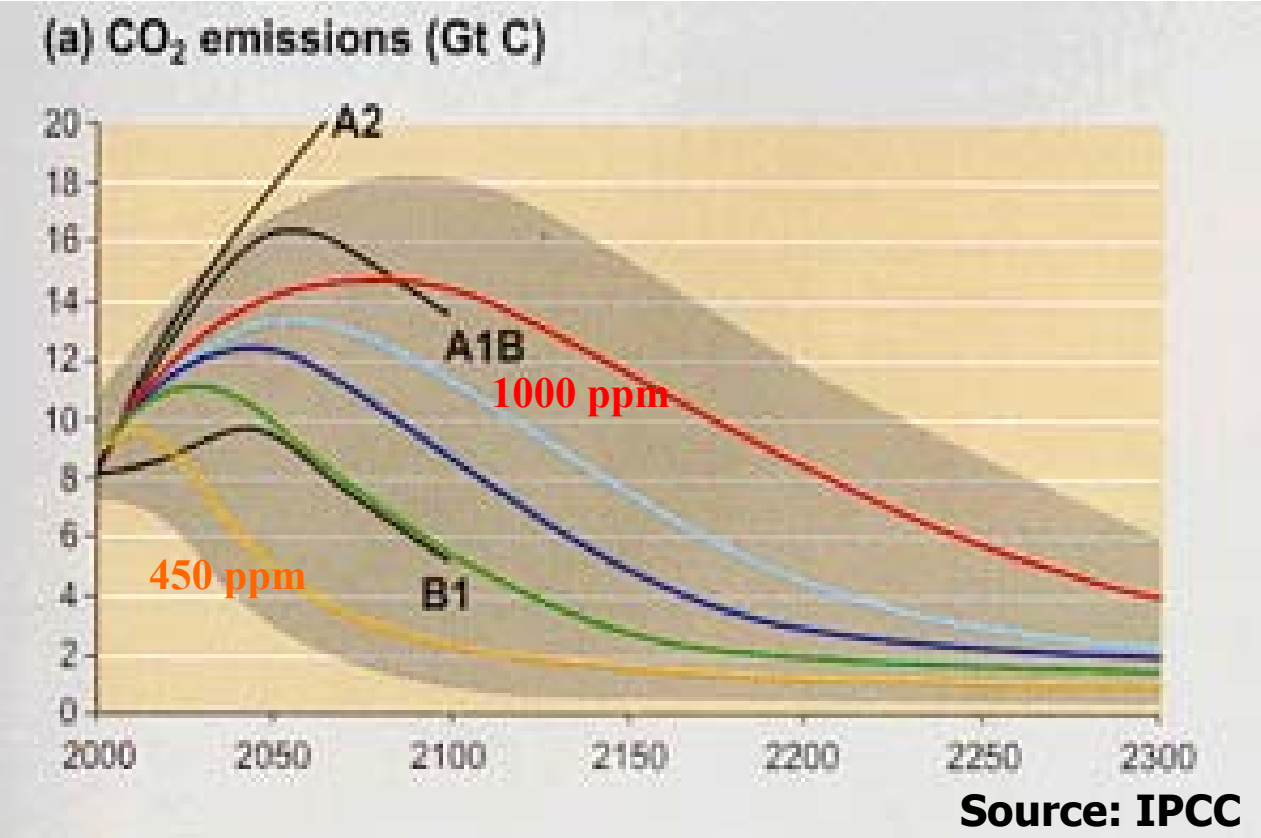
Why Markets?

- The problem is very challenging,…



The Challenge:

Enhancing prosperity in a world that protects the climate.

- …and markets are very powerful…
- …although probably not sufficient.

Why Markets?

- Economics – lower the cost of environmental protection:
  - **Efficiency**: allowances flow to the highest-value uses
  - Heterogeneity among sources
  - Imperfect information
  - Incentives for innovation
  - **Equity**: initial distribution does not affect efficiency

- Practicality:
  - Reduce the size of government and cost of regulating
  - Reduce regulatory uncertainty
  - Provide flexibility in implementation
  - Improve 'rule effectiveness' by eliminating waivers
  - Easiest with uniformly mixed pollutants

Basics (1) – Emission Reduction Credits (ERCs)

- Government sets a regulatory standard for specific sources
  - Usually an emissions rate (lb./hr. or ton/day)
- Firms can earn credits for operating below the standard or operate above the standard by buying credits
  - Credits are typically permanent, like a little piece of a permit

- Credit creation is voluntary and requires government oversight
- Cannot write derivative contracts (e.g. options)

Basics (2) – Cap and Trade (C/T)

- Government defines regulated sources and a total emissions cap
  - Usually mass emissions over a specified period (tons
- Government creates allowances and transfers them
  - Allowances are limited one-time authorizations to emit
  - Lottery, auction, direct allocation (e.g. historical or per capita)
- Government requires regulated sources to 'cover' emissions with allowances and specifies other rules
  - Monitoring and reporting, banking, enforcement

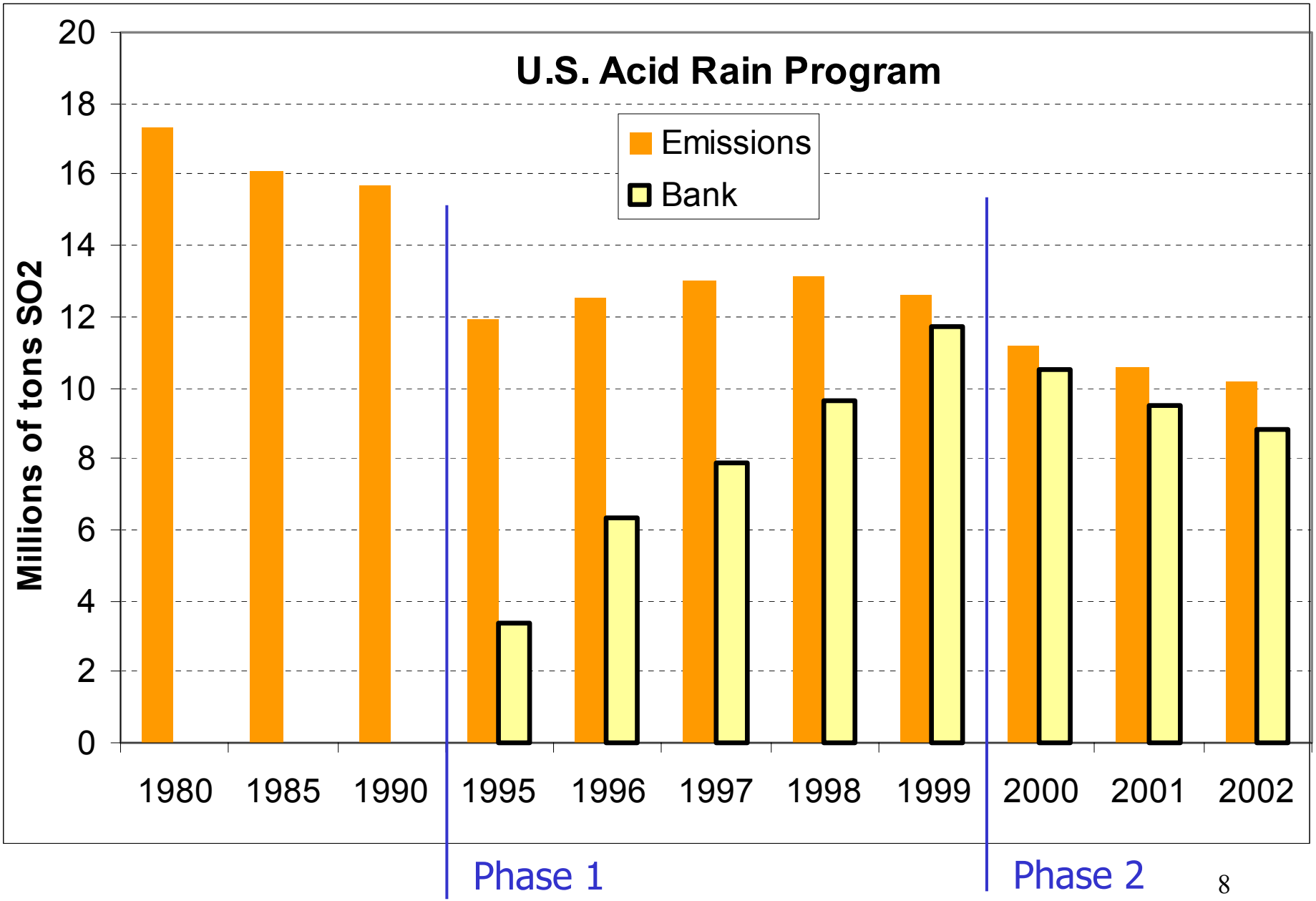
- Participation is mandatory, usually with automatic enforcement
- Government oversight generally limited to accounting
- Allowances begin to look like any other input to production

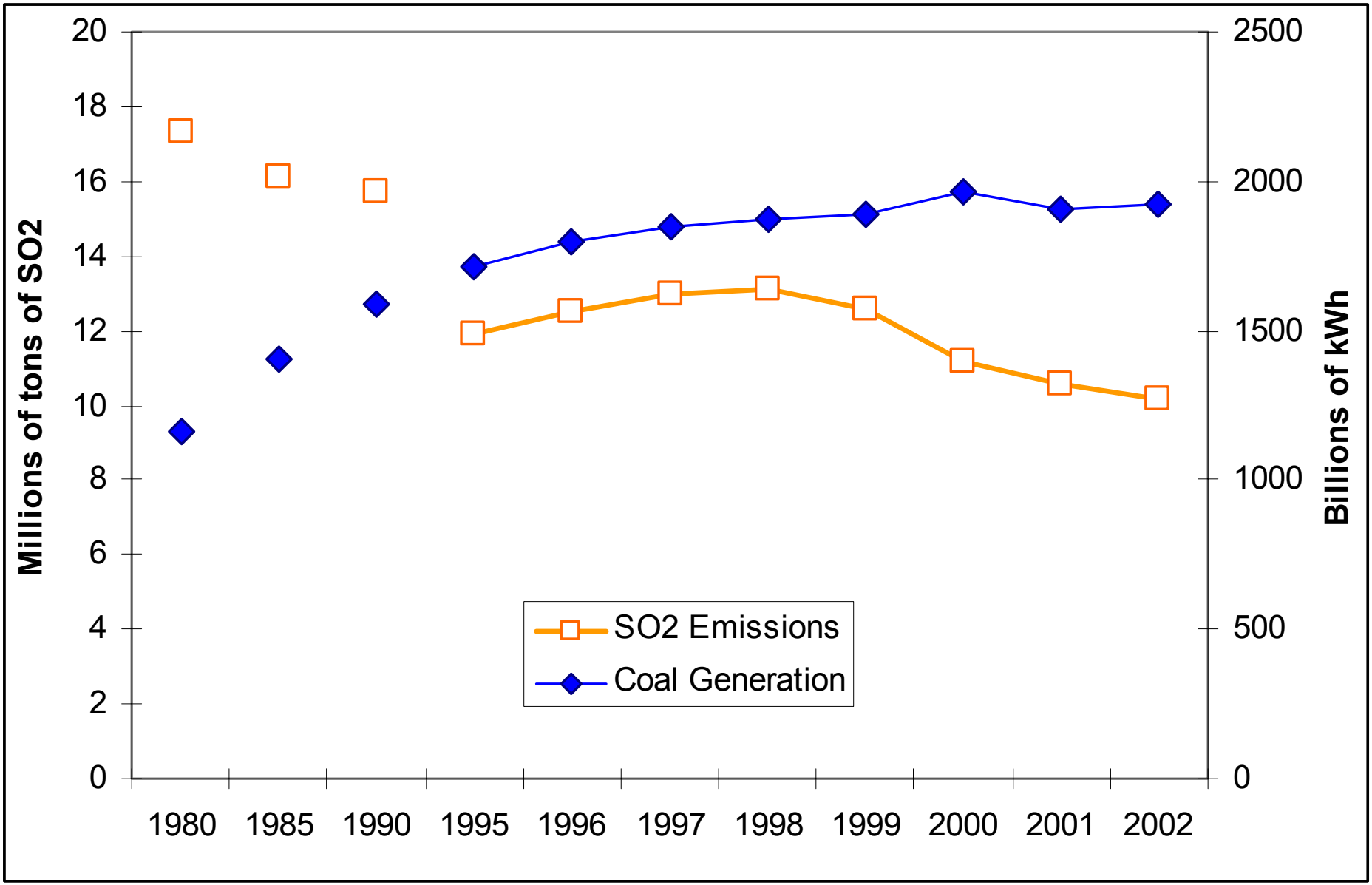
Some Successful Emission Markets

- Add Flexibility to Command-And-Control:
  - EPA Emission Trading Program
- **Cap Emissions Absolutely:**
  - **Acid Rain Program**
- Eliminate Pollutants:
  - Leaded Gasoline Phaseout
- **Control Local Problems:**
  - **Regional CLean Air Incentives Market (RECLAIM)**
- Create Multi-Lateral Markets:
  - Ozone Transport Commission NO_X Budget
- **Manage Product Performance:**
  - **EPA's Mobile Source Averaging, Banking and Trading**

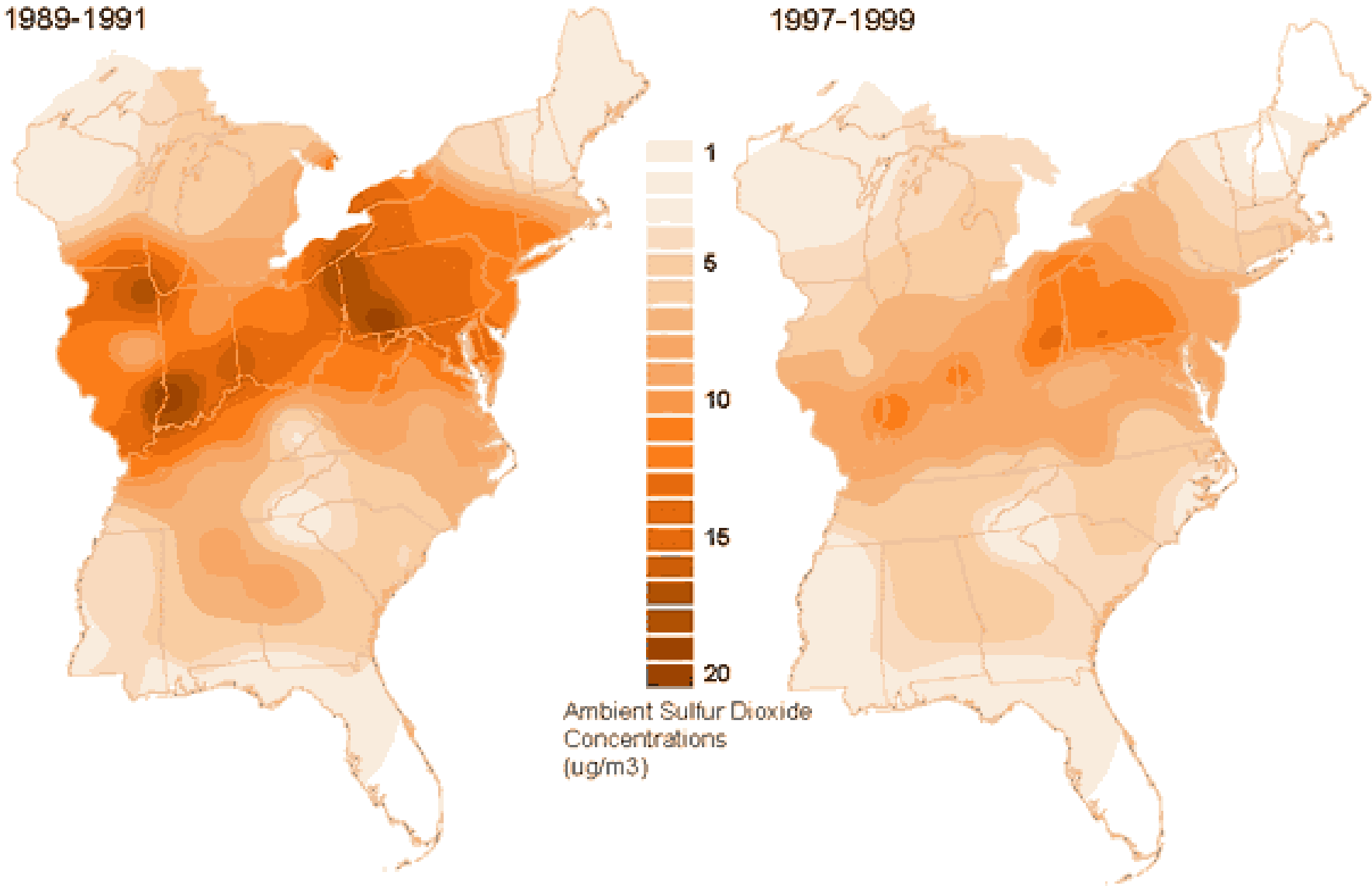
Acid Rain Program (Title IV)

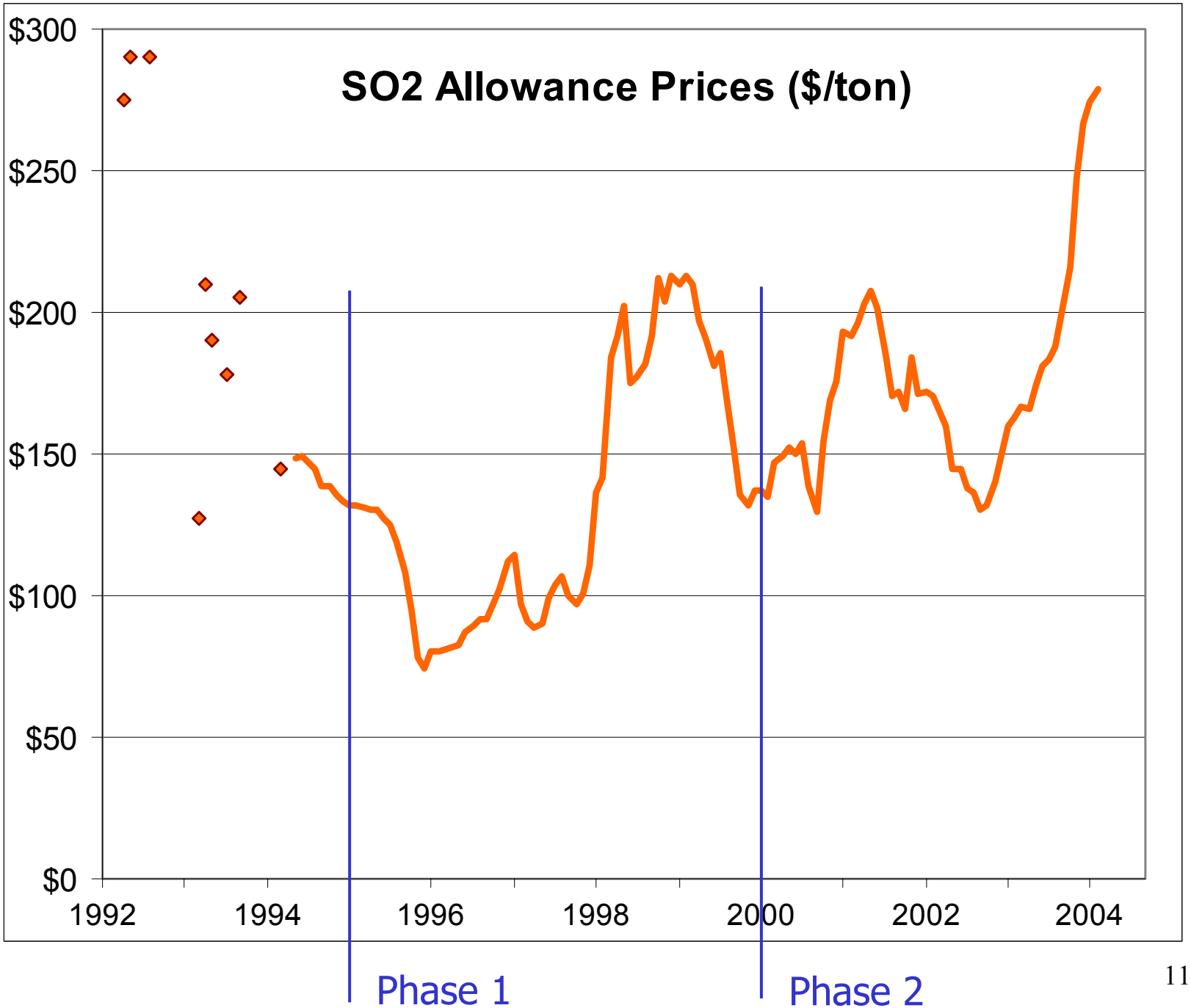
- "The Grand Experiment" – big and highly visible
- SO_2 emissions from power plants to reduce ecological damage
  - Phase 1: 1995-1999, 263 coal-fired power plants, 2.5 lb./mmBtu
  - Phase 2: 2000+, all coal-fired power plants, 1.2 lb./mmBtu
- Pre-existing health-based regulations remain in place
- Included auctions, unrestricted banking, new entrant set-aside
- Continuous Emissions Monitors
- Enforcement: Automatic fine and allowance penalties
  - 98 penalty tons of 95 Million emitted (99.9999%); >$2,000 each


U.S. Acid Rain Program
Millions of tons SO2
Emissions
Bank
0
2
4
6
8
10
12
14
16
18
20
1980
1985
1990
1995
1996
1997
1998
1999
2000
2001
2002
Phase 1
Phase 2


Millions of tons of SO2
Billions of kWh
20
18
16
14
12
10
8
6
4
2
0
2500
2000
1500
1000
500
0
1980
1985
1990
1995
1996
1997
1998
1999
2000
2001
2002
SO2 Emissions
Coal Generation

Recent changes in SO_2 Concentration




SO2 Allowance Prices ($/ton)
$300
$250
$200
$150
$100
$50
$0
1992
1994
1996
1998
2000
2002
2004
Phase 1
Phase 2

RECLAIM

- C/T program for SO_2 (75%) and NO_X (66%) in the LA basin
  - Will reach planned emission cuts this year

- Some problems
  - Mobile source provision found to violate Civil Rights Act
  - Regulated sources failed to control emissions adequately and emissions exceeded the cap in 1999-2001
  - 2000 - Power plants could afford to pay extremely high prices of $40,000/ton, some firms manipulated the market
  - 2001-2003 power sector withdrawn and placed under command and control regulation (other sectors continued)
  - Small firms find monitoring/reporting/trading difficult
  - No auctions or banking

Mobile Source Averaging/Banking/Trading

- ABT program is for vehicle makers and works like an ERC, except the standard is a 'family engine limit' for air pollution.
  - Similar to CAFE Credits
- Began in 1991, available for most modes (e.g. road, water, etc.)

- Averaging and Banking are widely used
- Trading is little used, possibly due to competitiveness issues
- Permitted EPA to set lower standards than they otherwise would have for some engine families.

Critiques of Emission Trading – And Responses

- Insufficient and may not always be appropriate.
  - Correct, but emission trading can be combined with other policies.
  - Localized effects are not applicable to greenhouse gases

- Fails on environmental justice: neighbors lose control/oversight.
  - Not really, rulemaking is an open political process
  - Trading can be transparent

- Commerce in 'licenses to pollute' is unethical.
  - Perhaps, if health or the environment are not protected
  - Is this worse than a command and control system with waivers?
  - Allowances need not be property rights

- Allocation to historical emitters is inefficient or wrong.
  - Grandfathering lowers incentives for control and innovation
  - Both a major challenge and an opportunity.

Lessons (1)

- Emission trading works.
  - It generally achieves environmental goals at lower costs, but it requires careful design and may not be always be appropriate.
- Cap and trade systems work better than credit programs.
  - Successfully applied to product standards.
  - Very little success in combining the two.
- Auctions and banking help emission markets work much better.
  - Price discovery, response to shocks, capital planning
- Successful programs have stringent monitoring and enforcement.
- Transparency is preferred by the public, but not by participants.
- Opt-in provisions do not seem effective or worthwhile.

Lessons (2)

- Costs have proven lower than forecasted in most cases.
  - Lower cost forecasts typically result in tighter limits.
- There is little evidence of leakage or employment impacts
  - But the law of unintended consequences is not repealed.
- Emission trading systems evolve.
  - Markets do not arise spontaneously, but can be fostered.
  - Tax and regulatory barriers (e.g. PUC) may need attention.
- Cap and trade systems make environmental protection a more ordinary business issue.
  - Not just an issue for EHS Department